



## **OZONE GENERATOR SYSTEMS**

***PRO 3400, CA 45, & CA 55***

***Owners Manual***



## Specifications

Model	PRO 3400	CA 45 - 2	CA 55 - 1
output	1000 up gradable to 3600 mg/hr	1000 up gradable to 3600 mg/hr	1000 up gradable to 3600 mg/hr
Fan size cfm	34 cfm	34 cfm	34 cfm
Filter	No	yes	yes
Cabinet	PVC cabinet with Stainless steel inner chassis	Stainless steel	Stainless steel
Generation method	Corona discharge	Corona discharge	Corona discharge
Weight & size	7 lb 14"X 5"X 5"		

### Operating requirements

PRO 3400, CA 45-2, & CA 55-1 require at least 1 out of the 5 generator plates to operate

## **PRO 3400, CA 45, & CA 55-1** **Ozone generator Owners Manual**

**CAUTION: READ INSTRUCTIONS THOROUGHLY BEFORE**  
**OPERATION OF UNIT**  
**(This ozone generator operates at 4200-5000 volts)**

### HOW OZONE WORKS:

Crystal Air air purifiers use ozone to decontaminate the air the same way nature uses lightning to create ozone to clean the air naturally. Ozone is very unstable and attaches to contaminants, mold, odors, etc. and oxidizes them. This reaction of ozone leaves an area with fresh clean air.

### WARRANTY

The PRO 3400, CA 45, & CA 55-1 is warranted against defects in materials and workmanship for a period of four years from date of purchase. Liability is limited to parts and labor only. Shipping is the sole responsibility of the customer. CRYSTALAIR is not liable for damage caused by shipping, misuse, neglect or lack of regular maintenance.

## **CAUTION: DO NOT PLUG UNIT IN WITH LID OFF**

1. Read complete instructions before using ozone generator
2. Open cabinet by following step 1 of the cleaning instructions. Check to make sure the generator plate has not moved out of place. Once this has been checked the cabinet lid may be reinstalled and the unit is ready for use.

## **PLACEMENT AND SETTING OF MACHINE**

1. (Placement) The CRYSTAL AIR PRO series 3400 is designed for universal application. This unit can be utilized as a portable service unit, or as a stationary air purifier unit.
- 2 a. The PRO Series controls feature an on/off switch powering the unit and fan. Ozone production begins when the variable ozone control is turned on.
- 2 d. (Setting Ozone Level ) The right level is when all the generated ozone is being used up accomplishing its job. However, this is difficult to obtain because it becomes a balancing act. Initially the unit output is set high to get rid of the problem odor as quickly as possible. As this is being accomplished less ozone is required for the diminishing odors, thereby leaving some residual ozone in the air. If the unit output is not turned down after awhile then more residual ozone will be in the air. If there is a heavy smell of ozone, then there is more ozone present than is required to do the job. Simply turn the rheostat (output level control) down. This is a case where more is not considered better. The levels of ozone required to clean most environments are from .03 ppm to .1 ppm.

## **MAINTENANCE**

Under heavy duty use or severely polluted areas, The CRYSTAL AIR purifier should be inspected every 2 to 3 weeks for fine dust or oily residue collecting on generator surfaces or plates. Light duty use requires cleaning every 2 weeks to 6 months depending severity of pollution and the humidity level  
NOTE: Do not use any lubricant in the unit. Failure to comply can cause serious damage to the internal components.

# **OZONE GENERATOR PLATE CLEANING INSTRUCTIONS** **(WARNING: HIGH VOLTAGE) Ensure that power supply is disconnected before starting any maintenance procedure or electrical shock injury may result.**

1. (PRO 3400) Locate and remove three Robertson screws from the top and bottom of the unit. Be very careful not to strip the screw holes when replacing. **(SEE FIG. 1)**

(CA 45 & CA 55) Locate and remove three Phillips screws from the top and bottom of the unit. Be very careful not to strip the screw holes when replacing. **(SEE FIG. 1a & 1b)**

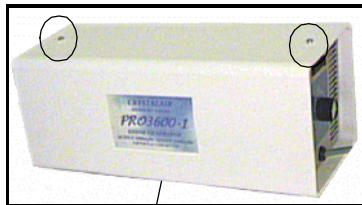


Figure 1 (PRO 3400)

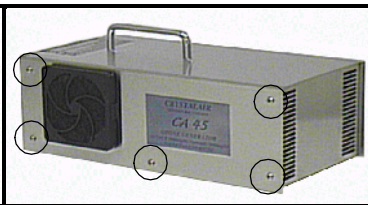


Figure 1a (CA 45)



Figure 1b (CA 55)

2. (PRO 3400) Gently slide out the generator chassis **(SEE FIG.2+3).**

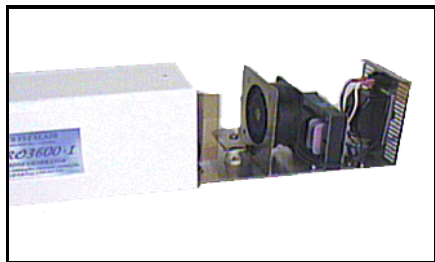


Figure 2

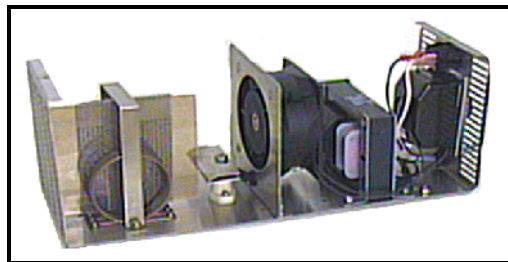


Figure 3

(CA 45 & CA 55) Gently lift lid off chassis.

1c. Locate and remove the 11/32 nut from the high voltage towers, and remove holding clamp **(SEE FIG. 4)**

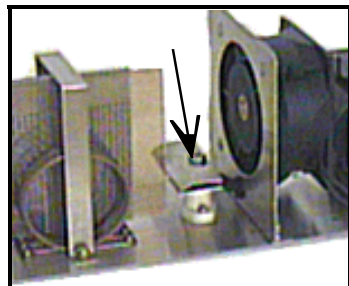


Figure 4

2. Grip plate just retainer clip gently lift up approx. 3/4 of the way, then re grip generator plate just above retainer clip again to ensure that plates do not spread and fall apart upon removal. **(SEE FIG. 5+6)**

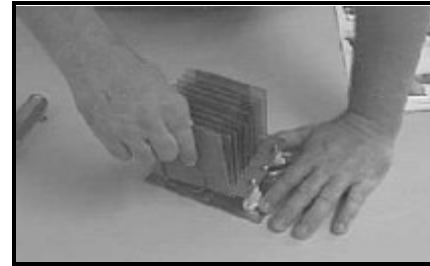


Figure 5

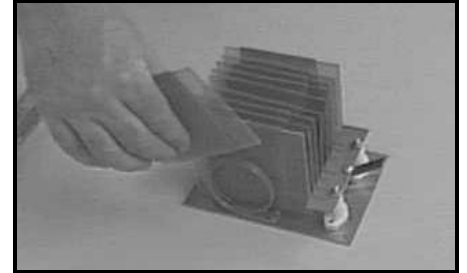


Figure 6

3. With thumb and index finger, grip mica and gently, remove from outer screen . Carefully separate and place the four pieces in a shallow tray and fill with approx. 1/2 in. of water and a few drops of dish soap **(SEE FIG. 7)**. Place mica sheet totally flat on bottom of tray, and with a tooth brush gently scrub both sides of mica to remove all oxidized material from surface **(SEE FIG. 7)**. Repeat on stainless steel screens then rinse all parts in clean water.



Figure 7

4. Once mica and stainless steel screen have been cleaned, place plate assembly on middle oven rack at approx. 200 to 300 F. for 1/2 to 1 hour to ensure plates are completely dry.

5. Once dried, mica plates must be inspected. Hold plate up to a light to ensure no arc holes have developed (**SEE FIG. 9**) or that any other damage is present (**SEE FIG. 8+9**). With a damp cloth, (not wet) wipe out ozone generator chamber, to remove any debris which may be present.

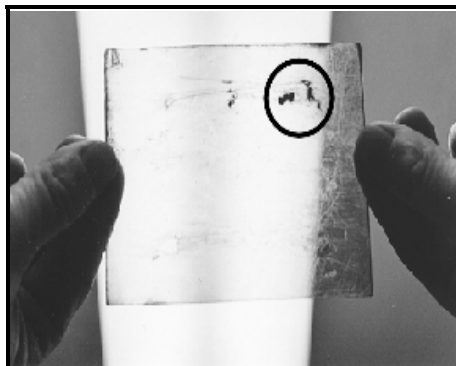


Figure 8

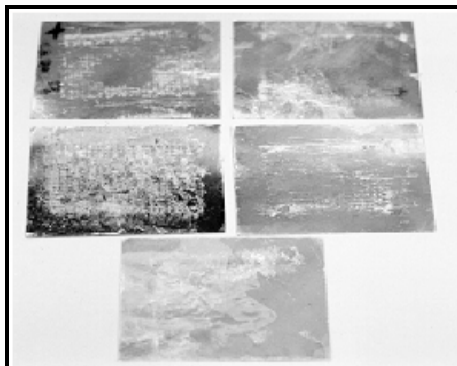


Figure 9

6. Once plates are inspected and dried, they may be reassembled. Place one mica sheet flat in the palm of your hand (**SEE FIG. 10**), then set the inner screen in the exact center of mica sheet. Then place the other sheet of mica on top forming a sandwich (**SEE FIG. 11**). With thumb and index finger grasp mica sandwich approx. half way (**be careful inner screen remains centered at all times**) and gently slide assembly back into outer screen. ( see figure 12)

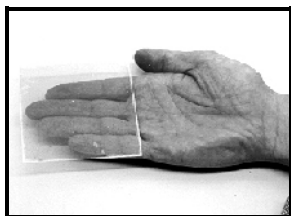


Figure 10

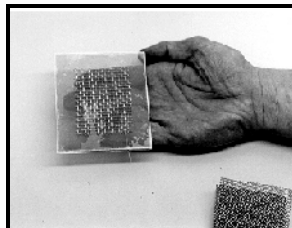


Figure 11

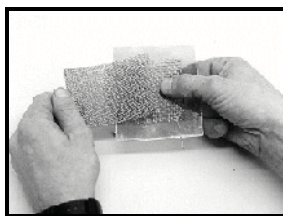


Figure 12

### **REPLACING SERVICED PLATE IN MACHINE**

7. Install plates in reverse order of removal being careful inner stainless steel screen remains centered at all times.

8. Once plates have been reinstalled, replace hose adapter with the two Phillips Screws, replace intake filters if dirty, then plug unit in and test for proper operation.

**Note #:****Cleaning, warranty work and repairs are available from Crystal Air or your local retail outlet.**

### **TROUBLESHOOTING:**

If unit makes a snapping or popping sound, moisture may be present in generator plate (remove and bake for one hour at 100 - 200 F.). Ensure upon reinstallation that both inner and outer stainless steel are centered as close as possible, and that all components of generator are clean, dry and damage free.

### **MORE TROUBLE SHOOTING:**

1. Fan works but no ozone:

A: Is the filter plugged ?

B: Are the plates clean and dry? (refer to maintenance section) if unit does not work after cleaning it will probably need to be sent in for service work.

2. Unit snaps or sparks:

A: Are the plates clean and dry? (refer to maintenance)

B: Is the center screen in the plate centered ? (If screen is off center place back in center of plate. (Refer to maintenance instructions for plate removal and replacement). **CAUTION:** (Be very careful not to scratch mica plates). If snapping or sparking still occurs, then make sure there are no little holes burned through the mica which will create a dead short.

## **Questions and Answers About Ozone**

**QUESTION: WHAT IS OZONE?**

**ANSWER:** Ozone is sometimes called "activated oxygen". It contains three atoms of oxygen rather than the two atoms we normally breathe. Ozone is the second most powerful oxidant in the world and its function is to destroy contaminants and odors. Interestingly ozone occurs quite readily in nature, most often as a result of lightning strikes that occur during thunderstorms. In fact that "fresh, clean, spring rain" smell that we notice after a storm most often results from nature's creation of ozone. Ozone is also created by water falls. However, we are probably most familiar with ozone from reading about the "ozone layer" that circles the planet above the earth's atmosphere. Here ozone is created by the sun's ultra-violet rays. This serves to protect us from ultra-violet radiation. Additionally, each of us is exposed to high levels of ozone daily for short periods of time. This happens in heavy traffic conditions or during times when the weather forces the industrial gases to remain lower to the ground than is otherwise normal. The combination of these two factors can result in ozone readings as high as 4 or 5 times the "regulatory" levels for continuous exposure with absolutely no adverse affects as our exposure is for such short periods, and the ozone itself decays back to normal oxygen so rapidly.

**QUESTION: HOW DOES OZONE WORK?**

**ANSWER:** While ozone is very powerful, it has a very short life cycle. When it is faced with odors, contamination, etc. the extra atom of oxygen destroys them completely by oxidation. In so doing, that extra atom of oxygen is destroyed and there is nothing left...no odor...no contamination...no extra atom, only oxygen. In addition to the effectiveness of ozone, we also know that it is safe to use. We know this from our own safe exposures daily to ozone,

weather, as noted earlier, resulting from being locked in traffic, or passing through industrial areas. These exposures have no effect on us beyond our acknowledging the unpleasant odor associated with this "filthy air". It is the very unpleasantness of this air that provides ozone with its "built in" safety mechanism. Ozone is safe because we notice its unpleasant odor at very residual levels. By residual we mean, the amount of ozone that is produced in excess of the required amount to kill whatever contamination or odor that may be present in the room. This equipment, when installed correctly will not exceed government guidelines for continuous safe exposure. Even if installed incorrectly, ozone provides its own protection, as ozone warns us in a manner similar to smoke in a room. Ozone does this by becoming so offensive at 1.5 parts per million that we would not be able to stay in the environment for any more than a short period. This is much like what would happen if we entered a smoke filled room. However, while smoke might harm us, research has proven that such a limited exposure to such a low level of ozone would have no serious long term affect on us just as it does not affect us when caught in a traffic jam during rush hour.

**QUESTION: *HOW IS OZONE PRODUCED?***

**ANSWER:** There are basically two methods of producing ozone...ultra-violet and corona discharge. Most equipment uses the corona discharge method, simulating in essence, lightning. Corona discharge ozone generators are fully adjustable. Equipment utilizing UV is not very popular because it is inefficient, unreliable, unadjustable, and very costly to service compared to the modern corona discharge equipment now available.

**QUESTION: *HOW LONG DOES THE OZONE LAST?***

**ANSWER:** As soon as ozone is formed in the generator and dispersed in a room some of it decays back into oxygen. This step occurs by several processes including the following: Natural decay (or reversion to oxygen) due to ozone chemical instability. Speeding up of the above process by the presence of such as walls, carpets etc. stimulating the decay process. Oxidation reaction with odor causing organic material, which removes ozone. Reactions with contamination etc., which again consumes ozone by oxidation reactions. Additionally ozone itself has a half life which means that "residual" ozone created (extra unneeded ozone) will return to oxygen within at most 30 minutes, in amounts equal to half its level. What this means is that after each subsequent 30 minute period there would be half as much residual ozone left at the end of the period as was present at the beginning of the period. This is similar to a numerical progression of 16;8;4;2;1. In practice the half life is usually less than 30 minutes due to contaminants in the air. Therefore, ozone while very powerful doesn't last long...just does its job and disappears.

**QUESTION: *WILL THE ODOR COME BACK?***

**ANSWER:** No. Ozone destroys the source of odor. However, in the case of mildew the odor will return if you are unable to get rid of the moisture that is the source of the mildew.

**QUESTION: *HOW DOES OZONE HANDLE TOBACCO SMOKE?***

**ANSWER:** It reduces the irritation caused by phenol gasses, by oxidizing them. Phenol gasses are the invisible part of tobacco smoke that causes such discomfort to one's eyes and create the offensive odors. Ozone rids any environment of the effects of smoke completely, rather than merely filtering out some of the visible particles like an "electronic air cleaner".

**QUESTION: *WHAT IS THE RIGHT LEVEL OF OZONE?***

**ANSWER:** The right level is when all the generated ozone is being used up accomplishing its job. However, this is difficult to obtain because it becomes a balancing act. Initially the machine's output is set high to get rid of the problem odor as quickly as possible. As this is being accomplished less ozone is required for the diminishing odor etc., thereby leaving some residual ozone in the air. If the machine output is not turned down after a while then more residual ozone will be in the air. If there is a heavy smell of ozone, then there is more ozone

present than is required to do the job. Simply turn the rheostat (output level control) down. This is a case where more is not considered better. Sales successes result when the dealer ensures that the results are what the customer expects. The most successful dealers usually install equipment on a trial basis and return to the trial location 24 hours later to ensure that residual ozone levels are not too high and that the customer knows how and when to regulate the machine to avoid a strong ozone smell.

**QUESTION: *IS OZONE HARMFUL AND WHAT IF ANY ARE THE LONG TERM EFFECTS?***

**ANSWER:** Ozone has been known for almost a century now, so quite a lot is known about it. Several regulatory agencies, including OSHA - Occupational safety and health agency in USA, and WCB Occupational safety and health agency in Canada, have stipulated that the maximum safe allowable level of residual ozone is 0.08 ppm based upon the historical safety of ozone. Note that this permissible level is for continuous exposure throughout an entire 8 hour day for 5 days a week. If anyone is exposed to that concentration of ozone, it is usually as the by product of an industrial process like arc-welding. The temporary affects of such a low exposure would range from headaches, to sore throats, irritation in the eyes, nose and the like, similar again to what we would experience in a traffic jam.

**QUESTION: *HOW CAN YOU TELL THE LEVEL OF OZONE?***

**ANSWER:** There are a number of mechanical methods available, the most common and effective being the Draeger tube, but the simplest, least expensive and very reliable method is using the Eco (ozone monitoring) Badge. Residual ozone becomes apparent to sensitive humans in the range of .01 - .03 ppm. or well below the permissible levels for continuous exposure. As noted previously, this residual ozone is extra ozone that is not required to reduce contamination etc. Adjustment of the rheostat is all that is required.

**QUESTION: *WHAT ARE THE APPLICABLE REGULATIONS REGARDING OZONE?***

**ANSWER:** In Canada the Worker's Compensation Board of B.C. guidelines stipulate that continuous exposure 8 hours a day for 5 days per week in an environment containing maximum level of 0.08 ppm. of ozone is safe. The normal concentrations that we will be using will be in the range of .01 - .03 ppm. well within the guidelines.

**QUESTION: *CAN OZONE BE HELPFUL for CRYOVAC'D BEEF?***

**ANSWER:** Yes. If the premises where meat is hung, cut and eventually cryovac'd, are treated with ozone, then this meat will be virtually contamination free as it is being packaged in the cryovac. And will consequently retain its good looks and stay fresh much longer before being sold or used than meat packed in an ozone free room where both odors and contamination count will be high. Treatment of coolers and cutting packaging rooms with ozone ensures not only a germ reduced environment, but also a clean smelling room that customers and employees alike associate with a caring and progressive management.

**IMPORTANT NOTE ON OZONE**

It is not necessary that you even smell the sweet smell of ozone (compared to fresh country air following a thunderstorm) for it to be effective. Even roses are an objectionable odor to some people, when in excess.

**1.TO SET OZONE:** Set ozone to a setting where you can barely detect ozone after an hour of operation.

**2.If ozone is still detected,** reduce ozone setting, if the disagreeable odor is still prevalent, increase ozone setting. Properly adjusted, neither ozone or the objectionable odor should be detected.

**3. levels of ozone required to deodorize most environments** are from 0.03 ppm to 0.1 ppm.

**4.CIRCULATION:** Air circulation is an important factor in how effectively ozone works. An oscillating fan should be placed next to generator for proper circulation.

**5.MOUNTING:** Generator should be mounted high in the room, 6 to 8 feet off the floor. Generator should be mounted above the door pointing away from sensitive areas.

**6.P.S.** When entering an enclosed area such as coolers, ozone should be reduced prior to entering.

## A BASIC GUIDE TO DEODORIZATION USING OZONE

### OZONE SHOCK TREATMENT PROCEDURE :

Suggested size: PRO-10,000 , PRO-5000 , PRO-3600-5

The idea of an ozone shock treatment procedure is to eliminate the initial contamination from the air and then provide continuous control over recurring contamination by way of ozone. First we must assess the caliber of the odor problem in order to determine the size of the Crystal Air ozone generator which would be required to sufficiently eliminate the problem odor in a short period of time. Once we have chosen the ideal size of ozone generator for the particular treatment area, the ozone generator should be placed pointing in the direction of the problem area. Strong fans must be placed throughout the area being treated to provide good ozone distribution. Operate the ozone generator at it's highest capacity for as long as it takes to eliminate the odor problem. In most cases it takes only a few minutes to do a shock treatment. If it is a type of odor that is absorbed in furniture, walls and bedding, for example, cigarette smoke, takes only 30 minutes with the proper sized ozone generator. After the shock treatment procedure is complete, air out room and place a Crystal Air ozone generator permanently along with an ozone monitor controller if odor problem is expected to be perpetual and constant. Severe cases may require a 24 hour treatment. Milder cases may need a smaller unit or use lower output setting.

NOTE# while performing a shock treatment, make sure that all people, pets, plants and other animals are vacant from the area to be treated. Also while using HIGH concentrations in a room, be sure that ozone does not leak into connected or occupied rooms by way of furnace vents or wall cracks etc..

### GARBAGE ROOMS:

Suggested Size: PRO Series 3600-1, 3600-5, Depending on the size of garbage room

Place the Crystal Air ozone generator on a shelf above the door entrance positioned so the air stream blows away from the sensitive entrance area. An additional oscillating fan will greatly enhance the deodorization results by mixing all the contaminated air efficiently with the generated ozone. A shock treatment procedure may be required as the first step to treatment in a garbage room. (Refer to OZONE SHOCK TREATMENT PROCEDURE above), depending on the severity of odors prior to placement of Crystal Air ozone generator. Humid rooms may need dry air routed to the ozone generator with a four inch vent hose.

### COMPACTOR BINS:

Suggested Size: PRO 3600-1, 3600-5, 5000 Depending on severity of odor.

Crystal Air PRO series ozone generator have a hose adapter for routing a four inch hose from ozone generator outlet to garbage compactor. Attach hose to a convenient location on compactor chute wall surface and boost the inlet hose of the Crystal Air ozone generator with a 265 cfm. fan to ensure the air in the compactor does not back through ozone generator. The ozone generator must be mounted in a place convenient to rout fresh air to it and be safe from exposure to water and rough treatment.

### GROCERY STORE STORAGE AREAS:

Suggested Size: PRO 3600-1, 3600-5 or PRO-5000 Depending on the size of the storage area

To reduce odors and reduce cross contamination of foods to other foods, install a Crystal Air ozone generator in an out of the way place, with an additional fan to circulate the ozone efficiently throughout the entire area to be treated. Next install an ozone generator monitor controller in the center of the treated area to ensure the levels of ozone do not exceed the limits set by the Workers Compensation Board Of BC which are .1 ppm. averaged over an eight hour work period. The controller will cycle on and off as needed to maintain control of ozone at the proper levels.

### HOTEL ROOMS:

Suggested Size: PRO-3600 1, PRO 3400-1, CA 55-1, or CA 45-2

These rooms can be generally deodorized in 30 to 40 minutes from cigarette or alcohol etc., by using a PRO-3600 1 or 2 and a 20" oscillating fan.

*Housekeeper should also wet/dry vacuum the contaminated areas, (ex. vomit, spilled milk, spilled beer). with a good detergent solution before deodorization procedure is performed.*

### ANIMAL URINE:

Suggested Size: PRO-3600-1, PRO-3600-5 Depending on the size of room to be treated.

Customer must locate and identify the area of the urine contamination if possible. Treat all contaminated surfaces with a liquid deodorizer. *(All liquid contaminants must first be treated with a liquid deodorizer).* Customer may have to pull up carpet, if present, in order to treat both sides if possible. Also treat the porous concrete or wood beneath the carpet. Allow liquid deodorizer to dry, then place Crystal Air ozone generator in the room with an additional fan to eliminate the gaseous odor absorbed by the carpet, walls, wood and fabric furniture, mattresses etc.. Treat up to 48 hours depending on the severity of odors.

DECOMPOSED PROTEIN: *Dependent on the size of room and contamination level.*

Protein contamination is the result of food products such as milk, fish, meat, eggs etc. Other sources are from human or animal bodily discharge (like blood, urine, feces etc), decomposed meat, decomposed animal within a crawl space, death scene (decomposed body). In all cases of decomposed protein, the source of the odor must be removed as the first step to deodorization. (It is suggested that gloves and a respirator be worn to reduce the exposure to fleas and deadly contamination). Next treat the contaminated surfaces of the floor or any other items the protein was contacting with a liquid sanitizing solution to kill the contamination. Then a good liquid deodorizer like C20 or equivalent should be applied to all contaminated surfaces. Once the liquid sanitizing and deodorizing has been applied and dried, the Crystal Air ozone generator may be placed in the treated area at a setting of medium to high to eliminate the gaseous odor absorbed by the walls and furniture etc. Use a strong fan to help force ozone in to the pores of walls and furniture fabric. **Note # Ozone may be set on a low setting before the technician does anything to deodorize the air in order to make the environment more comfortable to work in.**

### SMOKING LOUNGES:

Suggested Size: PRO-360, CA-15, CA-55-2, CA-45-2, PRO-3600-1. Dependent on the size of room and contamination level.

Crystal Air ozone generator should be properly sized for the specific area and number of possible smokers. Place the ozone generator close to the ceiling and away from roof exhaust vents. Complement the ozone generator with an oscillating fan to circulate and mix the ozone and contaminated air together to speed up the deodorization process. Adjust Crystal Air ozone generator so that there is just a fresh smell in the air..Begin with the ozone generator on low setting and work your way up slowly. One person at the establishment should be in charge of adjusting the ozone generator output as the number of smokers increase or decrease. If ozone is set for 40 smokers and 30 vacate, then the ozone generator should be adjusted to lower setting, otherwise the air will become excessively ozonated and possibly cause sore throat or headache. An ozone monitor controller may be installed to eliminate the need to constantly adjust the ozone output.

### OFFICES AND STORE FRONTS:

Suggested Size: PRO-360, CA-15, CA-55-1, 3400-1 Depending on the size of room and contamination level.

The same procedures are used here as in the smoking lounges with one exception, That usually there is no smoking in offices and store fronts, therefore a smaller ozone generator may be required.

### SMOKE DAMAGE CAUSED BY FIRE :

Suggested Size: PRO-10000, PRO-5000 Depending on the size of room and contamination level.

In cases of small fire and smoke damage (e.g.: Grease Fire on stove, Severe toaster fire, fire place back through, mattress fire, electrical fire etc). With smoke fumes the premises should be thoroughly cleaned including the forced air furnace system before deodorization begins. Place a Crystalair ozone generator on each level of the building accompanied with a good blower fan to force the ozone through the small pores of the walls, carpet, and furniture. This process may take up to 24 hours for adequate results to be achieved. Furniture and mattresses may need additional treatment by draping a sheet of plastic over them and placing an ozone generator underneath for approx. 1-2 hours.

### MOLD AND MILDEW:

Suggested Size: PRO-10000, PRO-5000, PRO-360 CA-15 or CA-55-1

Crystalair ozone generators reduce or eliminate the ability for the exposed mold, mildew and fungus to grow. Mold and mildew grow in dark and humid places where there is a lack of oxygen. In all cases the moisture and humidity in the walls, floor etc., must be removed to effectively eliminate the problem. Once moisture is removed, all visible mold and mildew must be removed, then a shock treatment procedure can be preformed lasting for 2-6 hrs. A small ozone generator can be used to help control continuous mildew problem odors.

#### AUTOMOBILES TRUCKS BOATS & RVs:

Suggested Size: PRO 360, PRO 36R, PRO 3400-1, PRO-3600-1, PRO-3600-5

Cigarette smoke and most other organic vapors can be removed from a car, truck, boat, motor home etc in 30-45 minutes. Place Crystalair ozone generator in automobile, roll windows down ½ inch, and adjust vent fan on full. Operate ozone at half to full for 30-45 minutes. Air out auto and smell for lingering odors. Repeat the procedure if necessary.

#### CAUTION:

Some auto odors are a result of chemical fragrance deodorizers that are non ozone depleting and therefore are very difficult to eliminate. Animal dander and oils become embedded under the carpet, and sometimes must be lifted and cleaned with C20 or equivalent liquid deodorizer before treatment with ozone.

MUSTY BOOKS: Suggested Size: PRO-3600-1, PRO-3600-5

Books must be placed in a room and be opened as wide as possible. Arrange Crystalair ozone generator and fan to blow over the books. This process should take no more than one hour. Repeat if necessary.

FURNITURE AND CLOTHING ARTICLES: PRO 3600-1, PRO 3600-5, PRO-5000.

Make or utilize a room of proper size to accommodate all the articles to be deodorized. Place circulating fans in the room to vigorously blow the ozone around the room to penetrate the porous materials. Route a four inch vent hose from the ozone output to a four inch cut out in the wall of the deodorization room. This procedure may go on for 1-12 hrs depending on the circumstances.

All procedures are basic. For more intense and extensive procedures, consult Crystal Air or refer to fire and flood manual for comprehensive procedures

#### RULES OF THUMB:

a. Odors created in a hot environment are embedded deeper in the pores of the materials such as curtains, furniture, wallboard etc. This is due to pores expanding when hot and contracting when cold. A warm environment will always produce better results than a cold one when deodorizing a gaseous odor.

b. Humidity always produces or enhances an odor. Existing odors are amplified to the human nose and odor causing contaminants like bacteria and fungus flourish in a warm and humid environment.

c. Overkill and persistence is the key to deodorizing.

d. An additional fan of high output is necessary in all ozone treatments for optimum results. The fan will force the ozone into the small pores of the material to remove the absorbed odors.

e. In all decomposed protein, use a powerful sanitizer or bactericide and a powerful liquid deodorizer like Crystal Air C-20, G-100 or equivalent.

f. Always use respirator and gloves when handling contaminated materials like rotten meats or dead animals.

g. Caution in areas of treatment using high levels of ozone. Treat all exposed natural rubber with a silicone spray or Vaseline in order to prevent cracking. This is not the case with fabric covered rubber cushions

h. Humid air supplied to the ozone generator will result in less ozone production. Dry air supplied to a generator will result in optimum ozone production.

\*Caution:\*

. The water in moist or wet surfaces of fabrics combined with high ozone may create Hydrogen Peroxide and result in bleached material. Avoid high humidity situations combined with high ozone concentrations.

### COMMON ODORS ELIMINATED WITH OZONE

- |   |                                     |
|---|-------------------------------------|
| •Aged Books                             | •Carbon Monoxide                    |
| •Hospital odors                         | •Methyl Mercaptan (Pet Urine)       |
| •Alcohol Beverages (Bars, Lounges etc.) | •Mildew                             |
| •All organic waste                      | •Mold                               |
| •Pet Odors                              | •Cigarette Smoke                    |
| •Auto Exhaust                           | •Rotting and Decaying Substances    |
| •Bacteria                               | •Most Organic Chemicals             |
| •Kitchen Smells                         | •Paint Fumes                        |
| •Oils and Greases                       | •Diesel Fumes                       |
| •Bathroom Odors                         | •Ripe or Rotten Foods               |
| •Body Odors                             | •Sewer Odors                        |
| •Burned Hair                            | •Fish Odors                         |
| •Burned Food                            | •Smoke                              |
|   | •Stale or Stuffy Rooms or Buildings |

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### MARKETS FOR CRYSTAL AIR OZONE EQUIPMENT

#### OFFICE AND ENVIRONMENT (Unoccupied Areas)

- |                    |                  |
|--------------------|------------------|
| •Garbage rooms     | •Damp basements  |
| •Cigarette Smoke   | •Storage rooms   |
| •Mold odors        | •Smoking lounges |
| •Pet odors         | •Restrooms       |
| •Mildew odors      | •Meeting rooms   |
| •Maintenance rooms |                  |

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#### HOTELS & MOTELS

- |  |  |
|--|--|
| •Garbage compactors (Unoccupied areas) | •lounges   |
| •Garbage areas                         | •Health clubs (Weight rooms, locker rooms, dirty linen rooms)      |
| •Linen rooms                           | •Restaurant or commercial industrial exhaust stack and gas stream. |
| •Change rooms (Pool)                   |  |
| •Kitchens                              |  |

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#### SHOPPING MALLS

- Food court garbage areas
- Garbage compactors

#### AUTOMOBILES & RVs

- Cigarette Smoke
- Pet odors
- Mildew odors

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#### PROPERTY MANAGEMENT

- Rental houses (Unoccupied)
  - Apartments (Unoccupied)
- Deodorizing between rentals for (tobacco, ethnic food cooking odors, pet odors)
  - Garbage rooms
  - Common recreation rooms
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CRYSTAL AIR  
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